AMENDMENTS TO THE CLAIMS

The following claim set replaces all prior versions, and listings, of claims in the application:

1. (Currently Amended) A method of withdrawal and return of blood in a patient undergoing extracorporeal blood treatment therapy comprising:

a. inserting a blood withdrawal catheter into a surface peripheral vein in the patient's arm;

b. advancing the catheter into a venous tree of the patient towards the heart a distance in a range of 20 to 65 cm and positioning a distal tip of the catheter beyond venous flappers in the peripheral vein, wherein the advancement ceases to position the tip in a vein at a shoulder of the patient;

c. ~~continuously~~ drawing blood from the catheter;

d. applying an extracorporeal treatment to the blood, and

e. returning the treated blood to the patient.

2. (Currently Amended) A method as in 1 where the treatment is ultrafiltration and the catheter is positioned in the vein for a period of at least four hours.

3. (Currently Amended) A method as in 1 where the treatment is hemofiltration and the catheter is positioned in the vein for a period of at least four hours.

4. (Currently Amended) A method as in 1 where the treatment is dialysis and the catheter is positioned in the vein for a period of at least four hours.

5. (Original) A method as in 1 where the treatment is selected from a group consisting of collecting platelet, collecting peripheral blood stem cells and performing a therapeutic apheresis procedure.

6 to 29. (Canceled).

30. (Currently Amended) A method for removing excess water from a patient comprising the steps of:

a. inserting a blood withdrawal catheter in a peripheral vein and maneuvering the catheter through the vein and vascular system of the patient to access a reservoir of blood in the large or great veins for continuous blood withdrawal, wherein a distal tip of the catheter is positioned beyond venous flappers in the vein;

b. drawing blood from the reservoir of blood into the withdrawal catheter and into a withdrawal blood tube of an extracorporeal blood circuit;

c. applying a reduced pressure to the withdrawal blood tube to cause blood to flow into the blood withdrawal catheter.

d. condensing the removed blood through a filter to separate the excess water from the blood;

e. returning the condensed blood into a second peripheral blood vessel in the patient, and

f. wherein a blood flow through the filter is less than two percent of a total cardiac output of the patient, and a flow of the excess fluid removed from the blood is in a range of 0.1 to 1.0 liters per hour.

31. (Original) A method as in claim 30 wherein the reduced pressure induces retrograde blood flow into the withdrawal catheter.

32. (Original) A method as in claim 30 further wherein the insertion of the withdrawal catheter includes first inserting an introducer catheter into the vein and then inserting the blood withdrawal catheter through the introducer catheter.

33. (Currently Amended) A method as in claim 30 wherein ~~the withdrawal catheter is maneuvered through the vein to a point in the vein beyond venous flapper valves~~an advancement of the distal tip of the catheter ceases to position the tip in a vein at a shoulder of the patient..

34. (Original) A method as in claim 30 wherein the blood withdrawal catheter is a peripherally inserted central catheter (PICC).

35. (Original) A method as in claim 34 wherein the PICC catheter is at least 25 centimeters (cm) long and no greater than 65 cm long.

36. (Currently Amended) A fluid removal apparatus comprising:

a blood removal catheter for insertion into a peripheral vein and having a size 16 standard gage needle or less, wherein the blood removal catheter has a length in a range of 20 to 65 cm and wherein a distal tip of the catheter is positionable beyond venous flappers of the venous system of the vein;

a pump connected between the blood removal catheter and the filter;

a filter having a blood inlet port coupled to the blood removal catheter, a blood outlet port, an excess fluid removal port, and a blood flow passage with porous membrane which passes fluids to the fluid removal port and retains solutes of 50,000 Daltons or greater, and

a blood return catheter for inserting into a peripheral vein or artery and having a size of 16 standard gage needle or less.

37. (Original) A fluid removal apparatus as in claim 36 wherein the blood removal catheter is a Peripherally Inserted Central Catheter (PICC).

38. (Original) A fluid removal apparatus as in claim 36 wherein the blood removal catheter has a diameter in a range of and including 0.5 millimeters to 1.5 millimeters.

39. (Original) A fluid removal apparatus as in claim 36 wherein the blood pump applies a negative pressure in a range of and including negative 100 to negative 300 millimeters of mercury.

40. (Original) A fluid removal apparatus as in claim 36 wherein the blood pump applies a negative pressure in a range of and including negative 150 to negative 200 millimeters of mercury.

41. (Original) A fluid removal apparatus as in claim 37 wherein the internal diameter of the PICC catheter is no more than 1.1 millimeters.

42. (Currently Amended) An apparatus for removing excess fluid from a patient comprising:

a blood removal catheter for insertion into a first peripheral vein of the patient, wherein the blood removal catheter is a long peripheral venous access cannula and said catheter further comprises a distal end positionable beyond venous flappers in a vein;

a filter having a blood inlet port in fluid communication with the blood removal catheter to receive blood removed directly from the first peripheral vein or artery, a blood outlet port, an excess fluid removal port, and a filter membrane between the fluid removal port and the blood inlet and outlet ports, wherein the filter membrane is sized to pass excess fluid from blood flowing through the filter at a rate in a range of 100 milliliters per hour (mL/hour) to 700 mL/hour, and

a blood return catheter in fluid communication with the blood outlet port and for inserting into a second peripheral vein or artery of the patient.

43. (Original) A fluid removal apparatus as in claim 42 wherein the blood removal catheter is a Peripherally Inserted Central Catheter (PICC).

44. (Original) A fluid removal apparatus as in claim 42 wherein the blood removal catheter has a diameter in a range of and including 0.5 millimeters to 1.5 millimeters.

45. (Original) A fluid removal apparatus as in claim 42 wherein the blood pump applies a negative pressure in a range of and including negative 100 to negative 300 millimeters of mercury.

46. (Original) A fluid removal apparatus as in claim 42 wherein the blood pump applies a negative pressure in a range of and including negative 150 to negative 200 millimeters of mercury.

47. (Original) A fluid removal apparatus as in claim 43 wherein the internal diameter of the PICC catheter is no more than 1.1 millimeters.

48. (Currently Amended) A catheter for insertion into a peripheral vein of a patient for continuous withdrawal of blood as a part of extracorporeal blood circulation circuit where said catheter is:

a. 20 to 65 cm long;

b. has internal lumen of 0.9 to 1.2 mm in diameter;

c. includes an air tight connector for connection to blood withdrawal tubing with a compression seal, and

d. a catheter tip positionable in a vein beyond venous flappers of the vein.~~,~~

49. (Original) A catheter as in claim 48, where said compression seal is a silicon ring.

50. (Original) A catheter as in claim 48, where said catheter is formed of urethane.

51. (Original) A catheter as in claim 48, where said compression seal is compressed between flat surfaces of a catheter hub and a blood tubing connector.

52. (Currently Amended) An extracorporeal method for treating blood from a patient comprising ~~the steps of~~:

a. inserting a blood withdrawal catheter in a surface peripheral vein of an extremity of the patient, and maneuvering the catheter through the vein of the patient to position a tip of the catheter in one of a large vein, great vein or vena cava to access a reservoir of blood ~~in the large or great veins~~ for continuous blood withdrawal;

b. ~~continuously~~ drawing blood from the reservoir of blood into the withdrawal catheter and into a withdrawal blood tube of an extracorporeal blood circuit, and

c. applying a ~~reduced~~ suction pressure to the withdrawal blood tube to cause blood to flow into the blood withdrawal catheter.

53. (New) An extracorporeal method for treating blood from a patient comprising:

a. withdrawing blood through a withdrawal needle in a surface peripheral vein in an extremity of the patient, and determining that an amount of blood being withdrawn is insufficient for treating the blood;

b. replacing the needle with a blood withdrawal catheter inserted in the surface peripheral vein, and maneuvering the catheter through the vein to position a tip of the catheter in one of a large vein, great vein or vena cava to access a reservoir of blood for continuous blood withdrawal;

c. drawing blood from the reservoir of blood into the withdrawal catheter and into a withdrawal blood tube of an extracorporeal blood circuit, and

d. applying a suction pressure to the withdrawal blood tube to cause blood to flow into the blood withdrawal catheter.

54. (New) An extracorporeal method as in claim 53 wherein the needle has a length of 35 cm to 40 cm.

55. (New) An extracorporeal method as in claim 53 wherein the determination that the amount of blood withdrawn is insufficient is made if a blood flow rate through the needle is less than 40 milliliter per minute.

56. (New) An extracorporeal method as in claim 53 wherein the treatment is ultrafiltration and the catheter is positioned in the vein for a period of at least four hours..

57. (New) A method as in 53 where the treatment is hemofiltration and the catheter is positioned in the vein for a period of at least four hours.

58. (New) A method as in 53 where the treatment is dialysis and the catheter is positioned in the vein for a period of at least four hours.

59. (New) A method as in 53 where the treatment is ultrafiltration.